

43. An erythropoietin (EPO) composition consisting essentially of glycosylated EPO molecules which contain, either (i) at least 4.3 N-acetyl lactosamine units with reference to an N-linked carbohydrate chain of said EPO molecules, or (ii) at least 13.0 N-acetyl lactosamine units with reference to total N-glycosylation of said glycosylated EPO molecules.
44. An erythropoietin (EPO) composition consisting essentially of glycosylated EPO molecules, wherein the average glycosylation degree of said EPO molecules is either (i) at least 4.3 N-acetyl lactosamine units with reference to an N-linked carbohydrate chain of said EPO molecules, or (ii) at least 13.0 N-acetyl lactosamine units with reference to total N-glycosylation of said glycosylated EPO molecules.
45. The EPO composition of claim 43 or 44, wherein (i) is at least 4.5 carbohydrate, or (ii) at least 13.5 EPO.
46. An erythropoietin (EPO) composition, consisting essentially of glycosylated EPO molecules having a value for the product of the average number of N-acetyl lactosamine units per EPO molecule with reference to an N-linked carbohydrate chain of an EPO molecule in said composition, multiplied by average sialic acid content of an EPO molecule of said composition, of (i) at least 43.3, or (ii) at least 130, relative to total N-glycosylation of an EPO molecule of said composition.
47. An erythropoietin (EPO) composition, consisting essentially of glycosylated EPO molecules, wherein the average value for the product of the sialic acid content of said EPO molecules (i) multiplied by the average number of N-acetyl lactosamine units with reference to an N-linked carbohydrate chain of said EPO molecules is at least 43.3, or (ii) multiplied by the average number of N-acetyl lactosamine units with reference to total N-glycosylation of said EPO molecules is at least 130.

48. The EPO composition of claim 46 or 47, wherein (i) is at least 46.7, or (ii) is at least 140.
49. The EPO composition of claim 46 or 47, wherein said glycosylated EPO molecules contain, on average, either (i) at least 4.3 N-acetyl lactosamine units with reference to an N-linked carbohydrate chain of said EPO molecule, or (ii) at least 13.0 N-acetyl lactosamine units per EPO molecule, with reference to total N-glycosylation of said EPO molecule.
50. The EPO composition of claim 43, 44, 46 or 47, containing from 2 to 5 glycosylated EPO isoforms.
51. The EPO composition of claim 50, containing 3 or 4 glycosylated EPO isoforms.
52. The EPO composition of claim 43 or 46, wherein said composition has a specific activity in vivo of at least 175,000 IU/mg of protein.
53. The EPO composition of claim 52, wherein said composition has a specific activity in vivo of at least 200,000 IU/mg of protein.
54. The EPO composition of claim 43 or 46, wherein the average sialic acid content per molecule of glycosylated EPO is at least 11.
55. The EPO composition of claim 43, 44, 46 or 47, wherein said glycosylated EPO molecules are produced by expression of exogenous DNA in a mammalian cell.
56. The EPO composition of claim 55, wherein said mammalian cell is a CHO cell, and the proportion of carbohydrate chains with N-acetyl lactosamine extensions (repeats) relative to total number of N-linked carbohydrate chains is at least 30%.

57. The EPO composition of claim 56, wherein the value for the product of (i) the proportion of carbohydrate chains with N-acetyl lactosamine repeats relative to total number of carbohydrate chains expressed in %, and (ii) the proportion of tetraantennary structures relative to the total number of carbohydrate chains expressed in % is at least 2400.
58. The EPO composition of claim 43, 44, 46 or 47, wherein said glycosylated EPO molecules are produced by expression of endogenous DNA in a human cell.
59. The EPO composition of claim 58, wherein the proportion of carbohydrate chains with N-acetyl lactosamine repeats, relative to the total number of carbohydrate chains, is at least 10%.
60. The EPO composition of claim 59, wherein the value for the product of (i) the proportion of carbohydrate chains with N-acetyl lactosamine repeats relative to total number of carbohydrate chains expressed in %, and (ii) the proportion of tetraantennary structures relative to total number of carbohydrate chains expressed in % is at least 800.
61. The EPO composition of 55, wherein said mammalian cell is cultured in a serum free medium.
62. The EPO composition of 58, wherein said human cell is cultured in a serum free medium.
63. The EPO composition of claim 43, 44, 46 or 47, further comprising a diluent, an auxillary substance, or a carrier.
64. A process for manufacturing the EPO composition of claim 43, 44, 46 or 47, comprising culturing a cell capable of producing said glycosylated EPO molecules.

65. A process for manufacturing the EPO composition of claim 43, 44, 46 or 47, comprising culturing a cell capable of producing said glycosylated EPO molecules under conditions by which said cell produces said glycosylated EPO molecules.
66. A process for manufacturing the EPO composition of claim 43, 44, 46 or 47, comprising separating said glycosylated EPO molecules from other components of an EPO composition.
67. The process of claim 65, comprising adding at least two carbohydrates to a culture medium in which said cell is cultured.
68. The process of claim 65, comprising adding at least three carbohydrates to a culture medium in which said cell is cultured.
69. The process of claim 67, wherein said carbohydrates comprise glucose, mannose, or galactose.
70. The process of claim 68, wherein said carbohydrates are glucose, mannose, and galactose.
71. The process of claim 65, further comprising controlled addition of at least one of (i) an essential amino acid, and (ii) a carbohydrate, depending upon need of said cell for nutrients.
72. The process of claim 71, further comprising determining concentration of glutamine in culture medium in which said cell is cultured, to determine whether to add said essential amino acid or said carbohydrate.
73. The process of claim 71, comprising adding (i) or (ii) over the entire growth rate of said cell.

74. The process of claim 71, wherein said nutrients comprise at least 2 carbohydrates.
75. The process of claim 74, wherein said nutrients comprise at least three carbohydrates.
76. The process of claim 65, comprising culturing said cell at a temperature of from 30° C to 35.5° C.
77. The method of claim 76, wherein said temperature is from 33° C to 35.0° C.
78. The process of claim 66, comprising separating said glycosylated EPO molecules via reverse phase chromatography, at a pH of from 6-8.
79. The process of claim 78, wherein said reverse phase chromatography comprises eluting with acetonitrile, ethanol, or isopropanol.
80. The process of claim 66, comprising separating said glycosylated EPO molecules via affinity chromatography with a triazine dye.
81. The process of claim 66, comprising separating said glycosylated EPO molecule via affinity chromatography using a lectin.
82. Process for increasing the specific activity of an erythropoietin (EPO) containing composition, comprising enriching said composition to produce a composition containing EPO molecules which have at least one of:
- (a) a large number of N-acetyl-lactosamine units
  - (b) a high value for the product of the number of N-acetyl-lactosamine units and the sialic acid content

- (c) a high proportion of N-acetyl-lactosamine repeats and
- (d) a high value for the product of the proportion of N-acetyl-lactosamine repeats and the proportion of tetraantennary carbohydrate structures.

83. The process of claim 82 comprising enriching said composition to contain EPO molecules having an average number of at least 4.3 N-acetyl-lactosamine units with reference to an N-linked carbohydrate chain of an EPO molecule or on average at least 13.0 N-acetyl-lactosamine units relative to the total N-glycosylation of an EPO molecule.

84. The process of claim 82, comprising enriching said composition to contain EPO molecules, having a value for the product of the average number of N-acetyl-lactosamine units with reference to an N-linked carbohydrate chain of an EPO molecule multiplied by the average sialic acid content of at least 43.3 or at least 130 relative to the total N-glycosylation of an EPO molecule.

85. The process of claim 82 comprising enriching said composition to contain EPO molecules, wherein

- (a) in the case of EPO from CHO cells said EPO molecules have an average proportion of at least 30% N-acetyl-lactosamine repeats relative to the total number of carbohydrate chains or
- (b) in the case of EPO from human cells said EPO molecules have an average proportion of at least 10% N-acetyl-lactosamine repeats relative to the total number of carbohydrate chains.

86. The process of claim 82, wherein

- (a) in the case of EPO from CHO cells, said EPO molecules have a value of the product of the average proportion of N-acetyl-lactosamine repeats relative to the